ASIAN DEVELOPMENT BANK
Operations Evaluation Department

PROJECT PERFORMANCE EVALUATION REPORT

FOR

KAZAKHSTAN

In this electronic file, the report is followed by the Management response.

Performance Evaluation Report

Project Number: PPE: KAZ 28403
Loan Number: 1455-KAZ
December 2005

KAZ: Road Rehabilitation Project

Operations Evaluation Department

Asian Development Bank

CURRENCY EQUIVALENTS

Currency Unit – tenge (T)

	At Appraisal (May 1996)	At Project Completion (August 2001)	At Operations Evaluation (December 2005)
T1.00 =	$0.0154	$0.0066	$0.0074
$1.00 =	T65.00	T151.99	T134.45

ABBREVIATIONS

AADT	–	annual average daily traffic
AASHTO	–	American Association of State Highway and Transportation Officials
ADB	–	Asian Development Bank
ADTA	–	advisory technical assistance
BME	–	benefit monitoring and evaluation
DOR	–	Department of Roads
EIRR	–	economic internal rate of return
FIDIC	–	Fédération Internationale des Ingénieurs Conseils (International Federation of Consulting Engineers)
FSU	–	former Soviet Union
GDP	–	gross domestic product
GOST	–	Gosudarstvennye Standarty (Soviet Standards)
HDM4	–	Highway Design and Maintenance Model Version 4
ICB	–	international competitive bidding
IFI	–	international financial institution
IRI	–	international roughness index
Kazdornii	–	Kazakhstan Road Science Research Institute
MOTC	–	Ministry of Transport and Communications
OED	–	Operations Evaluation Department
OEM	–	Operations Evaluation Mission
PCR	–	project completion report
PIU	–	project implementation unit
PPTA	–	project preparatory technical assistance
RRP	–	report and recommendation of the President
RSPS	–	road sector policy statement
SRA	–	State Road Authority
TA	–	technical assistance
VOC	–	vehicle operating cost

NOTE

In this report, "$" refers to US dollars.

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Operations Evaluation Department, PE-673

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The guidelines formally adopted by the Operations Evaluation Department (OED) on avoiding conflict of interest in its independent evaluations were observed in the preparation of this report. The fieldwork was undertaken by Phil Salt and Andrey Yershov (staff consultants) under the guidance of the mission leader. To the knowledge of the management of OED, there were no conflicts of interest of the persons preparing, reviewing, or approving this report.

APPENDIXES

Attachment: Management response

BASIC DATA

Project Preparation/Institution Building

TA No.	TA Name	Type	Person-Months	Amount ($000)	Approval Date
TA 2285	Preparation of Road Rehabilitation Program	PPTA	87	600	11 Jan 1995
TA 2631	Institutional Strengthening of the Road Sector[a]	ADTA	53	750	27 Aug 1996
TA 2632	Feasibility Study of Selected Priority Road Sections[b]	PPTA	20	250	27 Aug 1996

Key Project Data ($ million)	As per ADB Loan Documents	Actual
Total Project Cost	77.0	78.0
Foreign Exchange Cost	40.0	46.3
Local Currency Cost	37.0	31.7
ADB Loan Amount/Utilization	50.0	43.8
ADB Loan Amount/Cancellation		6.2

Key Dates	Expected	Actual
Fact-Finding		21 Feb-6 Mar 1996
Appraisal		7–17 May 1996
Loan Negotiations		24–26 July 1996
Board Approval		27 August 1996
Loan Agreement		18 October 1996
Loan Effectiveness	16 January 1997	31 March 1997
First Disbursement		5 June 1997
Project Completion	May 2000	August 2002
Loan Closing	30 November 2000	11 December 2002
Months (effectiveness to completion)	41	64

Economic Internal Rates of Return (%)	Appraisal	PCR	PPER
Economic Internal Rate of Return	21.5	14.7	19.8

Borrower Republic of Kazakhstan

Executing Agency Ministry of Transport and Communications

Mission Data

Type of Mission	No. of Missions	No. of Person-Days
Fact-Finding	1	37
Appraisal	1	32
Project Administration		
Inception	1	5
Review	5	25
Midterm Review	1	15
Special Loan Administration	1	3
Project Completion	1	16
Operations Evaluation	1	17

ADB = Asian Development Bank, ADTA = advisory technical assistance, PCR = project completion report, PPER = project performance evaluation report, PPTA = project preparatory technical assistance, TA = technical assistance.

[a] Attached technical assistance to Loan 1455-KAZ. ADB. 1996. *Technical Assistance to Kazakhstan for the Institutional Strengthening of the Road Sector*. Manila.

[b] Attached technical assistance to Loan 1455-KAZ. ADB. 1996. *Technical Assistance to Kazakhstan for the Feasibility Study of Selected Priority Road Sections*. Manila.

EXECUTIVE SUMMARY

This report details the findings of an evaluation of the Road Rehabilitation Project in Kazakhstan. The Project was Asian Development Bank's (ADB) first support for the transport sector in Kazakhstan. It was also the first road investment in the country supported by an international financial institution.

Kazakhstan is a large, landlocked country. Under the centrally planned economy of the former Soviet Union, it was a major supplier of raw materials and intermediate products, and provided strategic transport links between Russia and the Central Asian Republics. The breakup of the Soviet Union led to major transition challenges for Kazakhstan's road sector. Lack of maintenance caused road conditions to deteriorate. Since efficient transport is a prerequisite for building a market-based economy, the Government prioritized rehabilitation and maintenance of the road network. There was also a need to strengthen road sector institutions and policies. In the early 1990s the Government began to transfer some roles, such as civil works construction and transport services, to the private sector. The remaining institutions needed to be reoriented toward strategic management and regulatory roles. This would require strengthening of the institutions and their capacity, and improving the policy and legislative framework.

The rationale for the Project was that the deterioration of the road network had to be reversed if Kazakhstan were to realize its economic development potential. The Project would provide for more efficient movement of freight and passengers, strengthen institutional capacity in the road sector, and improve the road sector policy environment.

The largest component of the Project involved rehabilitation of a 192-kilometer (km) section of the country’s north–south road corridor. Another component supported maintenance of other sections of the corridor. A further component was to support institutional development and implementation of an agreed agenda for road sector reform and legislative changes.

The road rehabilitation component proved difficult to implement. The implementation arrangements followed international forms of bidding, contracts, and technical standards and specifications, but the Executing Agency had no prior experience with these. This made for a difficult working relationship between the supervision consultant and the contractor, and contributed to delays.

The pavement has extensive transverse cracking. This is aesthetically displeasing, but the road is performing adequately in terms of traffic handling. Cracking is common in countries with extreme temperature variations, and it need not impair performance or reduce asset life as long as adequate routine maintenance is carried out.

The immediate causes of the cracking are not well understood. Among the possibilities are inappropriate specifications for bitumen and aggregate, lapses in material quality control, poor standard of laying aggregate, weaknesses in the original road structure, and opening the base course to traffic before laying the wearing course. The underlying causes are clearer. The unfamiliar implementation arrangements led to the detailed design being less thorough than intended. This made it difficult for the Executing Agency, the consultant, and the contactor to use normal contractual mechanisms to address problems that arose during implementation.

The evaluation found no evidence to suggest that cracking would necessitate major remedial investment. Such investment is unlikely to be required as long as the Government continues to provide adequate routine maintenance.

Average annual daily traffic on the rehabilitated road increased from 1,295 vehicles at appraisal to an estimated 1,617 vehicles in 2005. Traffic growth was slightly slower than estimated at appraisal, reflecting the economic adjustment difficulties the country was experiencing in the early years of project implementation. As a result of sustained high economic growth since 2000, traffic growth is expected to be higher in the future.

The benefits to road users anticipated during appraisal have largely materialized. Road rehabilitation has roughly halved trip times and caused vehicle operating costs to fall by an average of about 20%. A significant adverse effect has been the rapid increase in road accidents on the rehabilitated road.

The economic reappraisal indicates that road rehabilitation has had relatively high economic returns, with an economic internal rate of return of 19.8%. Even in a scenario of sudden pavement deterioration, the original investment would still be justified by the relatively high economic returns already achieved.

The road maintenance component was simpler and achieved its intended results. There were no major problems implementing the road maintenance contracts following domestic bidding procedures. The road maintenance equipment procured under the Project has generally performed satisfactorily and continues to be used to maintain the north–south road corridor.

The institutional and policy support did not achieve its intended outcome. This was due to lack of Government ownership. The agreed agenda was overly ambitious, and ADB and the Government engaged in too little dialogue during project formulation. The advisory technical assistance was insufficient to bring about change, and its approach focused too much on preparing reports and too little on supporting national change processes.

The Project is rated successful, at the bottom end of the range of successful rating. It was assessed as relevant, less effective, efficient, and likely to be sustainable, with limited institutional and other impacts. The performance of ADB was less satisfactory. It did not adequately adapt project formulation to fit the country and sector circumstances and ensure Government ownership of reform proposals. It also provided too little support during implementation. The performance of the Government was satisfactory given Kazakhstan's ongoing transition from a centrally planned to a market economy, and its status as a newly independent country.

Since pavement deterioration cannot be completely ruled out, the Government will have to continue to carefully monitor pavement condition in order to identify any rapid deterioration that may occur and determine the most economical remedy.

The main lesson from the Project is that it may require an extended timeframe to bring about broad changes in policies, processes, and standards. International systems for road design, construction, and maintenance—as well as policies and institutional features—could not be quickly transferred to Kazakhstan to replace those of the former Soviet Union. In such circumstances, project design needs to incorporate a more realistic path of change, which may initially require less emphasis on international standards and implementation models, and more emphasis on gradually building familiarity and confidence in international methods.

Bruce Murray
Director General
Operations Evaluation Department


KAZAKHSTAN
ROAD REHABILITATION PROJECT
(as implemented)
71°00'E
83°00'E
53°00'N
42°00'N
RUSSIAN FEDERATION
MONGOLIA
PEOPLE'S REPUBLIC OF CHINA
KYRGYZ REPUBLIC
NORTH KAZAKHSTAN
AKMOLA
PAVLODAR
EAST KAZAKHSTAN
KARAGHANDY
ALMATY
JAMBYL
ASTANA
Petropavlovsk
Kostanai
Pavlodar
Oskemen
Karaghandy
Oral
Aktobe
Atyrau
Aktau
Kyzyl Orda
Taraz
Almaty
Shymkent
Makinsk
Ekibastuz
Semey
Temirtau
Akshatau
km 788
Balkhash
Gulshad
km 596
Saryshagan
Ayakoz
Taldykorgan
Saryozek
Shu
Siletiteniz Lake
Zaisan Lake
Alakol Lake
Balkhash Lake
Aral Sea
Caspian Sea
UZBEKISTAN
TURKMENISTAN
0 100 200 300
Kilometers
National Capital
Provincial Capital
City/Town
Project Road
Main Road
Railway
River
Provincial Boundary
International Boundary
Boundaries are not necessarily authoritative.
05-4989 RM

I. INTRODUCTION

A. Evaluation Purpose and Process

1. The Road Rehabilitation Project, Kazakhstan was selected as part of the annual random sample of completed projects post-evaluated by the Operations Evaluation Department (OED) of Asian Development Bank (ADB). The Operations Evaluation Mission (OEM) visited Kazakhstan from 7 to 23 June 2005. By that time there had been nearly 4 years of full operations since completion of civil works, which provided a sufficient basis for evaluating project performance. The evaluation report prepared by the Mission was used to field test OED's draft *Guidelines for Preparation of Project Performance Evaluation Reports for Public Sector Operations*. As such it incorporates revisions to the structure and rating system that were not incorporated in previous OED post-evaluation reports.

2. The evaluation draws upon a review of project documents and other relevant studies, and discussions between ADB staff and officials of Government agencies concerned with the Project, international financial institutions resident in Kazakhstan, contractors, and consultants. It incorporates the results of the OEM's field inspections of the rehabilitated road, traffic studies, a rapid beneficiary assessment, and updated road accident data. A copy of the draft evaluation report was shared with the concerned ADB departments and offices and those of the Borrower and the Executing Agency—the Ministry of Transport and Communications (MOTC)—and their views have been incorporated and acknowledged where relevant.

3. In 2004 the project completion report (PCR)[1] rated the Project partly successful.[2] Although it found the Project highly relevant to addressing the needs of the transport sector, it rated performance less effective, less efficient, and less sustainable. The main reason was that there were cracks in the rehabilitated pavement, which were reportedly due to poor quality bitumen. The PCR expected initial maintenance costs to be high because of the need to repair cracks because major remedial works would be required in 2008 at an estimated cost of $20 million (almost half the original cost of rehabilitation). The additional costs would reduce the economic internal rate of return (EIRR) from acceptable (14.7%) to borderline level (10.5%). The pavement defects had been the subject of a prolonged and unresolved dispute involving the Executing Agency, the contractor,[3] and the supervision consultant[4]. In the case of the Project's road maintenance component, the PCR rating reflected the findings that some of the equipment procured was unsuitable for Kazakhstan's extreme weather conditions. Regarding the project component to support road sector institutions and policy, the PCR found that there was a lack of ownership by the Government, and that none of the targeted outputs and outcomes had been achieved.

4. The PCR found that weaknesses in project implementation arrangements had contributed to performance problems. MOTC was proficient in the technical standards and implementation methods of the former Soviet Union (FSU), but had no experience with the International Federation of Consulting Engineers (FIDIC) contracting arrangements that were introduced by the Project. MOTC was also unfamiliar with ADB procurement procedures. During implementation these problems were exacerbated by frequent changes of staff of the project implementation unit (PIU). ADB review missions were considered too short and infrequent to help MOTC resolve the implementation issues.

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1 ADB. 2004. *Project Completion Report on the Road Rehabilitation Project (Loan 1455-KAZ) in Kazakhstan*. Manila.
2 The PCR mission was fielded on 9–16 July 2003.
3 Balfour Beatty and Merrell in association with Afdar and Zhezkazgar Zholdary.
4 Japan Overseas Consultant Co. Ltd. in association with Wilbur Smith Associates.

5. Since much of the PCR rating depended on its finding regarding the pavement defects, the evaluation examined the present condition of the pavement and interviewed a wide cross-section of persons involved in the construction. This helped clarify the nature, extent, and causes of the pavement defects, and helped establish their likely consequences and cost implications.

B. Project Objectives

6. The Project was classified as an economic growth project. According to the Report and Recommendation of the President (RRP),[5] its expected impact was to arrest the decline in potential for Kazakhstan's future sustainable development. Its three expected outcomes were (i) more efficient movement of freight and passengers, (ii) improved institutional capacity, and (iii) an improved policy support environment.[6]

7. The project framework of the RRP identified three categories of expected outputs. The first category, accounting for nearly all of the estimated project cost, was the rehabilitation of the 192 km Gulshad–Akshatau section of the Almaty–Astana[7] road corridor, maintenance of about 600 km of the corridor, and detailed design of about 200 km of other priority road sections to be identified by the attached project preparatory technical assistance (PPTA).[8] Two further categories of expected outputs were (i) institutional strengthening of the Department of Roads by establishing a state road authority and 19 *oblast* road authorities; providing support for associated capacity building in terms of network planning, budgeting and financing management, and pre-construction and bidding procedures; enhancing road maintenance capacity, including establishing of road maintenance standards; and establishing a human resources development plan for the road sector; and (ii) road sector policy and regulatory improvements based on implementation of a road sector policy statement (RSPS), drawn up during project formulation, which called for a Road Fund Decree, updated road legislation, and adoption of road user cost recovery practices. The latter two categories were supported by an attached ADTA for institutional strengthening.[9]

8. The grouping of project outcomes and outputs in the project framework (para. 7) was inconsistent with their grouping in the main text of the RRP. In the main text they were described as (i) road rehabilitation, (ii) road maintenance and institutional strengthening, and (iii) consulting services for benefit monitoring and evaluation and design of other road sections. The main text reflected the contribution of these outcomes and outputs to project cost, whereas the project framework gave added emphasis to the institutional and policy initiatives agreed in the policy dialogue.

9. In the project framework there was also some confusion over the choice of verifiable indicators at impact and outcome. For example, arresting road deterioration and improving the capability of the Department of Roads were both considered impact indicators, whereas it may have been more accurate to consider the former an output indicator and the latter an outcome indicator. The outcome indicators for road rehabilitation included the EIRR, but might also have included outcomes for users such as reductions in journey time and transport user costs.

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[5] ADB. 1996. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan and Technical Assistance Grants to the Republic of Kazakhstan for the Road Rehabilitation Project*. Manila.

[6] The project goal stated in the RRP is equated with project impact, and the project purpose is equated with outcome.

[7] The RRP referred to the Almaty–Akmola corridor. Akmola was renamed Astana in 1998.

[8] ADB. 1996. *Technical Assistance to Kazakhstan for the Feasibility Study of Selected Priority Road Sections*. Manila. (TA 2632-KAZ, for $250,000).

[9] ADB. 1996. *Technical Assistance to Kazakhstan for the Institutional Strengthening of the Road Sector*. Manila. (TA 2631-KAZ, for $750,000).

10. For rating purposes, the evaluation has grouped outputs and outcomes to reflect the OEM's understanding of the major distinct categories of support under the Project, taking into account both the main cost elements and the emphasis of the RRP on institutional and policy initiatives. The evaluation considers three groups of project components: (i) road rehabilitation, including design of future road improvements, (ii) road maintenance, and (iii) support for road sector institutions and policy. This grouping is reflected in the summary design and monitoring framework in Appendix 1.

II. DESIGN AND IMPLEMENTATION

A. Formulation

11. The Project was the first support for the road sector in Kazakhstan by an international financial institution. In 1995 ADB provided project preparatory technical assistance (PPTA) to prepare an investment in rehabilitation of priority roads.[10] After developing a priority list of 3,800 km of roads requiring rehabilitation and conducting technical and socioeconomic screening of 1,200 km of these roads, the PPTA identified the Almaty–Astana corridor as the top priority for rehabilitation and prepared a feasibility study of the Gulshad–Karaganda section. Based on the PPTA, the Government and ADB selected a 192 km section from Gulshad to Akshatau to be financed by the Project. Technical surveys showed that this section was heavily damaged. As a result, traffic speeds were low and vehicle operating costs (VOC) were high.

12. The PPTA was well prepared. In addition to identifying a suitable investment for ADB financing, it drew attention to the implementation challenges to be addressed. There was an established capacity of qualified engineers in Kazakhstan, but their training was based on the Soviet Standards (GOST) of the FSU and they had little familiarity with the international design standards used for international competitive bidding (ICB). The GOST standards were complex and difficult to correlate with international standards. Also, Government road agencies directly controlled the execution of works rather than employing an independent engineer to supervise the contractor, as FIDIC contracts require. The PPTA recommended that any local enterprise appointed for detailed design or construction supervision should work in association with an experienced international consultant to ensure quality control. It also identified a need to train engineers in ICB, FIDIC, project management, supervision, testing, and quality control. The PPTA also raised concerns about problems with the quality of available bitumen[11] and crushed aggregate[12] supplies. In the latter case it identified suitable quarries near the Gulshad–Akshatau road section.

13. In formulating the Project,[13] ADB followed standard approaches to implementation arrangements, consulting services, and procurement. This included use of ICB, FIDIC, international road construction standards, and design and supervision led by an experienced international consultant. No special provision (for example, providing a long-term adviser to MOTC) was made to guard against misunderstandings and conflicts that might arise as a result of unfamiliarity with international standards and contracting methods.

14. Policy dialogue during project formulation focused on development of the road sector policy statement (RSPS) to guide the road sector's transition from central planning to market orientation. This was intended to establish principles and priorities, delineate roles, and provide a

[10] ADB. 1995. *Technical Assistance to Kazakhstan for Preparation of a Road Rehabilitation Program*. Manila.
[11] Oil distillate used for the surface layer of the road.
[12] Crushed stone or other material used for construction of pavement.
[13] The loan Fact-Finding Mission was from 21 February to 6 March 1996, and the Appraisal Mission was from 7 to 17 May 1996. ADB's Board approved the Project on 27 August 1996.

basis for updating legislation. An initial draft RSPS was prepared during a mission to review the PPTA in November 1995. This was discussed at the fact-finding stage and confirmed before appraisal without MOTC raising any major issues. It set a comprehensive reform agenda centered around the transfer of roles from the state to the market, reorienting the remaining state institutions to concentrate on strategic management and regulation, and improving cost recovery. It is difficult to understand how or why the Government would have agreed to such an extensive reform agenda. The road sector institutions were proud of their achievements under the FSU and would have viewed international methods with skepticism. The most likely explanation is that the RSPS lacked Government ownership. It appears that the RSPS was largely prepared by the ADB mission. There is a similarity between this Project's RSPS and the road sector policy statement included in another ADB-financed project approved the previous year.[14] Since the form of MOTC approval of the RSPS was quite vague, perhaps the Government did not consider this a binding commitment.

B. Rationale

15. There was a strong rationale for ADB to provide support for road rehabilitation. Kazakhstan is a vast, landlocked country. It is sparsely populated, with dispersed natural resources and centers of economic activity. Within the centrally planned economy of the FSU, it was a supplier of raw materials and intermediate products, and its road and railway networks provided strategic transport links between the Russian Federation and the Central Asian republics. Because of these unusual characteristics, the economy became the world's most freight intensive in terms of freight transport per capita.[15] The decline and breakup of the Soviet Union brought serious challenges for the road sector. After 1991 there was initially a sharp decline in transport demand, with freight and passenger traffic falling by more than 50%. A lack of maintenance—linked to the severe economic contraction and tight fiscal situation during the period around the breakup of the Soviet Union—had caused the condition of the road network to deteriorate. A survey of pavement condition in 1992–93 found that 52% of national roads were in poor condition, 32% were in fair condition, and only 16% were in good condition. Surveys in 1994 pointed to further deterioration. Since efficient transport was considered essential for economic recovery and transformation into a market-based economy, by the mid-1990s the Government attached high priority to rehabilitation and maintenance of the national road network.

16. There was also a good case for institutional and policy support. The transition to a market economy had required major changes in the role of the transport sector. Under the FSU all road sector responsibilities were carried out by the state. In the early 1990s, the Government initiated reforms to establish a new policy, legal, and regulatory basis for the road sector, transfer civil works and transport service provision to the private sector, and restructure the remaining public role. The civil works function of the Motor Road Department was restructured into a joint stock company in 1993 and then privatized in 1996. Through the privatization program, most transport services were put in private hands. The remaining Government road functions were placed under a restructured Department of Roads. By the mid-1990s the first round of structural changes had been carried out, but it was not yet known whether they would be effective. A host of institutional development challenges remained, and capacity building was needed to support the performance of the new system. Aspects needing improvement included road sector policy, the regulatory environment, planning and budgeting, design and supervision, road maintenance programming and financing, road safety and environmental standards, and human resource capacity.

[14] ADB. 1995. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan and Technical Assistance Grant to Mongolia for the Roads Development Project (Mongolia)*. Manila.

[15] For example, while India's population is 50 times that of Kazakhstan, it generates only twice as much freight volume.

17. After Kazakhstan joined ADB in January 1994, the initial program of ADB assistance was guided by an interim operating strategy that sought to facilitate the country's transition to a market economy.[16] Support for rehabilitation of infrastructure was integral to this strategy, since further deterioration in infrastructure would harm the long-term potential of the country. It was envisaged that ADB support would focus on projects that did not require intensive management and were within the implementation capacity of the Government. Support would also address issues related to the policy and regulatory environment, sector restructuring, cost recovery, efficient pricing, commercialization, enterprise reform, capacity building, and human resource development.

C. Cost, Financing, and Executing Arrangements

18. As reported in the PCR, the actual project cost of $78.0 million was close to the appraisal estimate of $77.0 million. The main changes in costs were for civil works and maintenance equipment. Civil works cost $41.2 million, compared with $36.2 million estimated at appraisal. The increase reflected variations in quantities of work required compared with the original contract estimates. Road maintenance equipment cost $11.5 million, compared with $5.8 million at appraisal, because bid prices were higher than expected. These cost increases were met from contingencies. The actual costs of routine maintenance ($12.4 million) and consulting services for road rehabilitation ($4.6 million) were close to the appraisal estimates.

19. The actual financing shares were $43.8 million (56%) from ADB and $34.2 million from the Government. This compared with appraisal estimates of $50 million (65%) from ADB and $27 million from the Government. The main reason for this change was that the Government decided to finance interest during construction ($9.1 million). A comparison of actual and estimated project costs and financing is in Appendix 2.

20. As envisaged at appraisal, MOTC was the Executing Agency and its roads department was the Implementing Agency. A PIU in the Implementing Agency was responsible for day-to-day project management. Changes of the minister and MOTC reorganizations led to frequent changes of staff in the Executing Agency, Implementing Agency, and PIU.[17] New PIU teams took time to understand the Project and its implementation requirements. This impaired the PIU's ability to deal with implementation problems, particularly those concerning civil works for road rehabilitation. The staff turnover in the Executing Agency also meant that the original ideas behind the support for institutions and policy became obscured and eventually lost. At the beginning of 2002, as part of a wider policy decision to rationalize the use of PIUs, the Ministry of Finance abolished the PIU for the Project. By that time, most project activities had been completed.

D. Procurement, Scheduling, and Construction

21. **Procurement**. The road rehabilitation civil works were procured through a single contract using ICB among prequalified bidders. The contract was awarded to the lowest evaluated substantially responsive bidder. Procurement of road maintenance equipment was through a single supply contract awarded through ICB. These were carried out in accordance with ADB's *Guidelines for Procurement.* The routine maintenance support was procured through 13 Government-financed contracts using local competitive bidding procedures, as agreed at appraisal.

[16] ADB. 1993. *The Bank's Interim Country Operational Strategies in Kazakhstan and the Kyrgyz Republic*. Informal Board Paper. Manila.

[17] The roads department was renamed several times during project implementation. At appraisal, it was called the Department of Roads. By the time of the OEM, it was called the Committee for Road Infrastructure Development.

22. **Scheduling**. Project implementation took about 6 years, compared with 4 years estimated at appraisal. As indicated in the PCR, this was primarily due to delays in the road rehabilitation component, notably (i) an extended preconstruction period caused by the Executing Agency's lack of familiarity with ICB and FIDIC-type contracts (14.5 months compared with 6 months estimated at appraisal); (ii) a prolonged mobilization period caused by winter conditions and difficulties transporting the contractor's equipment (6 months compared with 2 months at appraisal); and (iii) an extended construction period caused by a slow initial rate of construction and problems with supply of materials, particularly bitumen (about 39 months compared with 31 months at appraisal).

23. There were also delays in the procurement of road maintenance equipment. It took 20 months to complete tendering up to contract award, compared with 6 months estimated at appraisal. MOTC proposed that all but one bid be declared unresponsive, and it took time for ADB, the design and supervision consultant, and MOTC to agree on the lowest evaluated substantially responsive bidder. This was linked to MOTC's unfamiliarity with ICB procedures. A comparison of the actual and appraisal schedules is in Appendix 3.

24. **Construction**. A series of problems were encountered during the road-rehabilitation civil works. These mainly concerned pavement defects. Since these problems have a significant bearing on the overall evaluation of the Project, the OEM examined them in some detail. The nature of the problems that occurred during construction is summarized below. Their implications for project outputs, effectiveness, and efficiency are discussed in later sections. A chronological narrative of the main events in implementation of civil works is in Appendix 4.

25. In 1998 only 12 km of the 192 km was completed, and only 8 km had a wearing surface. This was due to initial weaknesses in contractor management and shortages of construction equipment. These problems were subsequently corrected. It also reflected difficulty in obtaining bitumen supplies, which was a problem throughout construction. Over the remainder of construction (from 1999 to 2001) the rate of construction was generally acceptable, except that, because of the shortage of bitumen, much of the new base course was often without wearing course when construction was halted for the winter.

26. The two main defects concerned raveling[18] and transverse (thermal) cracking. Both were evident after the first construction season. Over the course of the construction period raveling was often a contentious issue between MOTC, the consultant, and the contractor. On the other hand, while there was also extensive transverse cracking of the base course and wearing course, this was not considered a serious problem until the end of construction.

27. MOTC seems to have associated raveling with the use of mine waste as construction aggregate. At contract negotiations, MOTC was reluctant to use mine waste but the contractor had commissioned independent materials tests indicating that the mine waste satisfied the American Association of State Highway and Transportation Officials (AASHTO) standards referenced in the contract specifications. In 1999, after the emergence of raveling, MOTC commissioned a domestic institute to run further tests. These confirmed the earlier result, but also indicated that the material might not have met GOST standards, had GOST standards been used in the contract. In 2000 the contactor addressed the raveling problem by surface-dressing the affected areas, and by removing and replacing the surface material in severely affected areas. Although raveling did not recur on a significant scale, it continued to be a controversial subject over the remainder of the construction period. In 2000 MOTC presented a claim for damages

[18] A process in which coarse material on the road surface loosens and separates from the roadbed because of a lack of binder or poor gradation of material.

against the supervision consultant. According to the PCR, this was on the grounds that the aggregate did not meet GOST standards—even though GOST standards were not part of the contract.[19] Later, in 2000, MOTC commissioned another international consultant to run tests on the mine waste aggregates. These included tests—not specified in the contract documents—that suggested possible undesirable properties. However, in 2001 further testing by another international consultant found that the aggregates fully met contract specifications. In 2003 MOTC withdrew its claim against the supervision consultant.

28. Transverse cracking was evident throughout the construction period. At the end of each winter break, further transverse cracking of the base course and the wearing course was observed. In 2000, after laying test sections, the consultant and contractor concluded that a single thick layer would be more crack resistant than the two-layer approach specified in the contract. However, MOTC declined the proposed contract variation. At substantial completion in August 2001, and again at the end of the defects liability period in August 2002, the consultant considered that the works had been satisfactorily completed and endorsed the contractor's final claim. However, MOTC was unwilling to settle the final claim, and subsequently indicated that it might seek arbitration.[20] An independent technical audit conducted in late 2002 by another international consultant commissioned by MOTC said that there was extensive cracking, and attributed this mainly to deficiencies in the quality of bitumen. It estimated that additional routine maintenance of $600,000 would be required for crack filling over the next 5 years, and that in 2008 the wearing course should be recycled and compacted and a new wearing course provided, at a cost of $20 million. By the time the OEM took place in mid-2005, the contractor final claim remained unpaid and it was still not clear whether arbitration would proceed.[21]

29. To gain further insight into the causes of construction defects, the OEM consulted with a range of people who took part in different parts of the construction process, including representatives of MOTC, the consultant, the contractor, the road maintenance authority, and other technical experts and officials. These consultations suggested that the cracking could have a variety of causes other than problems with bitumen quality. Possible causes could include (i) inappropriate specifications for bitumen and/or aggregate; (ii) lapses in material quality control; (iii) for standard of laying asphaltic concrete; (iv) weaknesses in the underlying structure of the original road;[22] and (v) opening of the base course for traffic before the wearing course had been laid (para. 25).[23] The OEM concluded that without extensive technical investigation, including excavations of the road, it would be impossible to determine the actual causes of the defects.

E. Design Changes

30. There were no major changes in scope during implementation.

F. Outputs

31. **Road Rehabilitation**. The physical outputs of the road rehabilitation component were as envisaged at appraisal. The Gulshad–Akshatau road was rehabilitated to a 7 meter (m) surfaced

[19] Claim for damages of $951,570.
[20] Contractor's final claim for $3,318,887.67.
[21] The Ministry of Justice, which is handling this matter, declined to meet with the OEM.
[22] By choosing to rehabilitate rather than rebuild the road, the Government was able to carry out the works at a much lower unit cost, which made good economic sense. However, this meant that weaknesses in the original construction of the underlying structures, including the embankment, roadbed, and drainage, were not fully addressed in the design. Such weaknesses can eventually be a source of structural problems with newly laid flexible pavements, leading to increased maintenance and reduced asset life.
[23] In some cases the exposed base course was subject to cracking. While the cracks were repaired and tested before laying the wearing course, it is not known whether the strength of the base course was affected.

width, generally with 8 cm of coarse graded asphaltic concrete base overlaid with 5 cm of dense asphaltic concrete wearing course, and 2.4 m shoulders. A summary of the physical accomplishments of the Project is in Appendix 5.

32. The OEM inspected the rehabilitated road and found that it was generally well built, except for two defects: (i) transverse cracking at intervals of about one to three car lengths (100–150 cracks per km) throughout the 192 km; and (ii) about 5–10 short sections of severely deteriorated road surface, each about 10–20 m in length. Photographs of the rehabilitated road are in Appendix 6.

33. In countries such as Kazakhstan that experience extreme temperature variations, some element of cracking of flexible pavements is unavoidable.[24] The extent of cracking can be limited by using certain specifications for aggregate and bitumen, but it is difficult to avoid cracking altogether. The cracking on the project road is aesthetically displeasing, but it does not significantly affect ride quality at present. However, it does make the roadway susceptible to consequent damage from water and frost–thaw cycles. This means that a rigorous approach to routine maintenance must be followed, since cracks can quickly expand in freeze–thaw conditions, leading eventually to rapid surface breakup. As long as adequate routine maintenance is carried out to fill cracks, they need not impair the performance of the road or shorten the asset life.

34. Routine maintenance of cracks on the project road is being carried out to a high standard. At the time of the OEM it appeared that virtually every transverse crack on the 192 km road section had been sealed. The staff of the *oblast* road authority responsible for routine maintenance demonstrated good technical knowledge of the maintenance techniques and materials required for sealing such cracks.

35. The short sections of severely deteriorated road surface are accident hazards, especially in icy winter conditions.[25] While the *oblast* road authority has made efforts to maintain these sections using patching techniques, this is not a permanent solution. At some point they will have to be reconstructed. An important deficiency is that at present there is no signage to warn drivers of these upcoming accident hazards.

36. Through the attached PPTA, a feasibility study of selected priority road sections was completed. Detailed designs for these sections were then prepared under the Project.

37. **Support for Maintenance**. The physical outputs of the road maintenance support component were as envisaged at appraisal. Routine maintenance was carried out over several sections of road, totaling about 600 km, along the Almaty–Astana corridor between 1999 and 2001. This contributed to improving the traffic-handling performance of these sections. Some 299 road maintenance equipment items were procured. Most of the road maintenance expenditure was on trucks, pickups, sand spreaders, snow ploughs, and spare parts. These were mainly for use by the Kazakhavtodor[26] road maintenance branches of the Astana, Almaty, Zhambyl, Karaganda, Pavlodar, and North-Kazakhstan *oblasts*. The equipment contributed to improved maintenance capacity at the *oblast* level.

[24] This problem is recognized in parts of Canada, such as Saskatchewan, that have temperature conditions similar to Kazakhstan's. Cracks also appeared in an ADB-financed road in the northeastern part of the People's Republic of China, an area that is also subject to extreme temperature variations.
[25] Additional deterioration may occur in future, especially in winter, and this could lead to further accident black spots.
[26] The state road contractor.

38. **Institutions and Policy Support**. The outputs of the institutional and policy support component were less than envisaged at appraisal. The supervision consultant developed routine road maintenance standards and a manual, but failed to gain MOTC's support for using these to replace existing standards and approaches to routine maintenance. All of the studies included under the attached ADTA were completed, including organizational development and capacity building studies, and studies analyzing the possible adoption of a systems development plan, a human resource development plan, a road user cost recovery program, and a road transport act. However, few of the recommendations of these studies were implemented, so their actual outputs in terms of improved road sector institutions were minor. Similarly, few of the policy reforms envisaged by the RSPS were implemented, notably (i) the road user cost recovery program was briefly adopted but then abandoned when the Road Fund was abolished in 1998; (ii) the proposed committee for transport sector legal reforms was not formed to review existing laws and regulations and prepare updated legislation on roads and road transport; and (iii) the proposed national transport advisory committee was not formed to guide further road sector reforms. While new Road Act legislation was approved in 2001[27] and various road sector policy and institutional reforms were carried out,[28] these were not attributable to the Project.

G. Consultants

39. An international consultant was recruited to design and supervise road rehabilitation, support procurement of road maintenance equipment, and carry out benefit monitoring and evaluation. Recruitment followed ADB's *Guidelines on the Use of Consultants*. The overall performance of the consultant was satisfactory, although its initial performance was less satisfactory.

40. The consultant began facing difficulties during contract negotiation. MOTC indicated that the draft detailed designs and tender documents for the road rehabilitation civil works had already been prepared by a domestic consultant, and asked that the consultant's initial task of supervising all stages of the detailed design and preparing the tender documents should be reduced to a one-month review of the work already completed by the domestic consultant. This was not in accordance with the terms of reference (TOR) and was at odds with the advice of the PPTA (para. 12). In requiring this change, MOTC risked compromising the quality of the detailed design and contract documents. Since neither MOTC nor the domestic consultant were familiar with international standards or FIDIC, they may not have fully appreciated this. ADB was represented at the contract negotiation and should have objected. Former staff of the consultant and contractor interviewed by the OEM said that the documents prepared by the domestic consultant were of poor quality. The review process, which took about 4 months, was fraught with difficulty. The designs and documents had to be redone. Successive rounds of changes, exacerbated by translation problems between Russian and English, led to repeated friction between the consultant, MOTC, and the domestic consultant, immediately harming the working relationship between the consultant and MOTC. While the final designs and contract documents were of an acceptable standard, the process by which they were prepared, including a lack of supervision of detailed technical surveys and tests prescribed in the outline TOR, was not a good way to start the country's first ICB road project.

[27] The Executing Agency confirmed that Parliament accepted the following laws and decrees: (i) Decree of the Government of the Republic of Kazakhstan "About the Improvement of the Legal Base of the Road Management", No. 845, 7 September 1998; (ii) Decree of the Government of the Republic of Kazakhstan "About the Concept for the Road Sector Development of the Republic of Kazakhstan for the Years 2001–2008", No. 726, 29 May 2001; and (iii) Law of the Republic of Kazakhstan "About the Roads", No. 245, 17 July 2001.

[28] The Executing Agency referred to (i) the Program for Road Sector Development of the Republic of Kazakhstan for the years 2001–2005, which is nearing completion; and (ii) the proposed Program for the Road Sector Development of the Republic of Kazakhstan for the years 2006–2012.

41. The supervision consultant repeatedly changed its international staff during its first 2 years of work. Another problem was that the consultant's senior staff were initially based in Almaty, some 600 km from the site. Since MOTC was unfamiliar with the role of the independent engineer under FIDIC and needed to be convinced of its worth, these initial weaknesses harmed the process of building a positive working relationship between MOTC and the consultant.

42. In 1999, an engineer with extensive international experience in construction supervision and FIDIC took over as team leader. He was based on site and—according to people interviewed by the OEM—appears to have followed best practices in terms of quality management, planning, documentation and testing of materials, and workmanship for compliance with specification. At site this expert maintained a technical documentation library and a laboratory for testing materials, including aggregate and bitumen, and provided on-the-job training for domestic staff. Following this change in personnel the consultant performed satisfactorily up to completion of services in 2002.

H. Loan Covenants

43. The Government complied with standard loan covenants, except that it abolished both the PIU (para. 20) and the project steering committee in 2002. By then the Project was substantially completed so this non-compliance did not materially affect the Project.

44. The Government did not comply with the three specific covenants intended to bring about implementation of the RSPS:[29] (i) although it briefly adopted improved cost recovery measures, they were abandoned when the Road Fund was abolished (para. 38); (ii) drawing upon the work of the ADTA consultant, a high-level committee for transport sector legal reforms was to prepare legal reforms and issue regulations, but this committee was not formed; and (iii) as required under the RSPS, a national transport advisory committee was to guide further transport sector reforms, but this committee also was not formed.

I. Policy Setting

45. In the nearly 10 years since project approval, Kazakhstan has continued its transition toward economic liberalization and market orientation. The problems of adjustment were eased by growth in oil and gas production and revenues. The economic contraction, unemployment, social concerns, and tight fiscal situation of the period immediately following the collapse of the Soviet Union gave way to a period of sustained high economic growth, rising incomes and employment, and greatly improved Government finances. With reduced reliance on external investment financing, the extent to which IFIs could influence policy agendas was reduced.

46. These overall patterns were also evident in the road sector. The transport services market is now liberalized, with service providers free to set prices.[30] The path toward change was slower for the principal Government institutions responsible for managing the road network. MOTC and Kazakhavtodor still operate along traditional bureaucratic lines and conduct their operations according to rules and norms rather than actual needs. There remains a lack of reliable data on traffic and road conditions and a lack of planning systems for road maintenance.[31] With improved fiscal conditions, budgets for roads have increased. The Government could afford to raise maintenance budgets substantially and forestall the increases in road user charges advocated by

[29] Loan Agreement, Schedule 6, paras. 3 and 7–9.
[30] There are still some elements of monopolistic practices and problems with licensing and standards.
[31] Center for System Research of the President's Administration of the Republic of Kazakhstan, 2005. *State Roads development Program for 2006–2015*. Astana.

IFIs. One comparatively recent development is that the Government now recognizes that Kazakhstan has a serious road safety problem, and is giving increased priority to improvement of road safety. Overall, road sector policies have evolved in a manner consistent with the direction advocated by ADB, albeit over a longer timeframe than estimated by ADB. However, the pace, sequencing, and details of the reforms were determined by the Government, and there is no evidence that ADB played a meaningful role in supporting the policy reform process. ADB was unable to find ways to engage substantially in the reform of the Kazakhstan road sector.

III. PERFORMANCE ASSESSMENT

A. Overall Assessment

47. The overall assessment of the Project was *successful.* It was, however, at the lower limit of the range of performances that could be considered successful. This was based on separate assessments for the three groups of project components (para. 10). Both the road rehabilitation and road maintenance components were rated successful, while the institutions and policy component was rated unsuccessful.

48. To arrive at the overall assessment, the individual component ratings were aggregated using weightings developed by the OEM: road rehabilitation (55%); road maintenance (25%); and institutions and policy (20%). These reflect the relative importance of the component groupings to expected overall project outcomes, taking into account their contribution to project cost at appraisal, and adjusted to recognize the emphasis that the RRP attached to supporting institutions and policy. The rating of each component group used four criteria: relevance (20% weight), effectiveness (30%), efficiency (30%), and sustainability (20%). Individual criterion ratings were in whole numbers from 0 to 3, in increasing order of project performance.[32] The overall assessment is summarized in Table 1. Further details are in Appendix 7.

Table 1: Overall Performance Assessment

	Project Component			
Criterion	**Road Rehabilitation**	**Road Maintenance**	**Institutions and Policy**	**Overall**
1. Relevance	2	3	1	2.1
2. Effectiveness	1	2	0	1.1
3. Efficiency	3	2	0	2.2
4. Sustainability	2	2	0	1.6
Total Rating[a]	**2.0**	**2.2**	**0.2**	**1.6**

[a] Highly successful > 2.7; successful 2.7 ≥ S ≥ 1.6; partly successful 1.6 > PS ≥ 0.8; unsuccessful < 0.8.
Source: Operations Evaluation Mission.

B. Relevance

49. The Project is rated *relevant* (Table 1). The road maintenance component was rated highly relevant, the road rehabilitation component was rated relevant, and the support for institutions and policy component were rated less relevant. The rating takes account of (i) relevance to the country's priorities and ADB's country and sector strategies, (ii) adequacy of

[32] For example, irrelevant (0), less relevant (1), relevant (2), and highly relevant (3).

justification for the respective interventions, and (iii) extent that each intervention was appropriately designed to achieve the intended outcomes and impacts.

50. All three components were fully consistent with Government priorities at the time of appraisal and evaluation:

(i) At appraisal, improvement of the Almaty–Astana road corridor was the Government's top priority for road improvement. The corridor continues to be the country's most important national highway, serving as the main north–south route for domestic traffic and a strategic link to Russia and Europe for international and transit traffic. It also facilitated the relocation of the national capital from Almaty to the new city of Astana. The offices of the central Government were transferred to Astana in 1997, and Astana's population increased from about 250,000 in 1996 to about 550,000 in 2005.

(ii) At appraisal, support for institutional strengthening and capacity building and for policy and regulatory improvements were relevant to the road sector's transition from a centrally planned to a market-oriented model. Roles formerly carried out by the public sector—such as transport services and some construction—had been transferred to the private sector, and the role of the public sector needed to be revised accordingly.

51. The three components were consistent with ADB's country strategy at the time of appraisal and evaluation. Support for rehabilitation and maintenance of infrastructure, and for road sector institutional and policy reform, were part of ADB's interim country operating strategy for supporting Kazakhstan's transition to a market economy (para. 17). These are also priorities in ADB's current country strategy, which emphasizes investment in rehabilitation and maintenance of roads that are part of the regional transport network, improving managerial and strategic capacity, enhancing construction and maintenance standards, and promoting market reforms.[33]

52. The need for rehabilitation and improved maintenance of the Almaty–Astana corridor was clearly demonstrated by the surveys and analysis conducted by the PPTA.

53. Project relevance was weakened by the design of the road rehabilitation and institutions and policy components. Although most aspects of the former component were well formulated, the implementation arrangements failed to allow for MOTC's lack of familiarity with international standards, FIDIC contracts, and ADB procedures such as ICB. It was clear from the PPTA and from dialogue with the project processing missions that road sector professional and technical staff in Kazakhstan followed FSU standards and project management practices. They had a long tradition of doing so, and many were understandably skeptical about international approaches.

54. This weakness in design led to recurring conflicts (i) between international standards and FSU standards; (ii) between international and FSU methods of assigning responsibilities for civil works execution;[34] and (iii) between MOTC, on one hand, and consultant and contractor, on the other. As a result there were misunderstandings and project management arrangements did not always function as intended. This was an impediment to effective communication between MOTC, the consultant, and the contractor in resolving technical problems. There were several adverse consequences that detracted from project outcomes, including: (i) since MOTC reduced

[33] ADB. 2005. *Country Strategy and Program Update 2006-2008, Kazakhstan*. Manila.

[34] While the Project followed the roles for the client, consultant, and contractor defined under the FIDIC contract, under the FSU approach the client retained full authority over construction.

the role of the international consultant in the detailed design (para. 40), it is likely that the quality of design was lower than it would have been had it been prepared under the full supervision of the international consultant, as intended; and (ii) although the consultant brought defects to MOTC's attention and suggested technical ways to address them, MOTC had difficulty accepting the consultant's advice, which in some instances led to defects not being addressed.[35]

55. Since this was the first IFI road project in Kazakhstan, it would have been appropriate to adapt ADB's standard implementation arrangements to better address these circumstances. Options might have included placing a long-term technical advisor in MOTC to provide intensive staff training, attaching a road engineer to ADB's Kazakhstan Resident Mission, making a commitment to provide frequent ADB review missions or staff consultant inputs, or adopting modified standards or forms of contract.[36]

56. Given the lack of results achieved by the institutions and policy component, the OEM concludes that the design of this component was flawed. While the RSPS provided a potentially attractive reform agenda, and while there was a case for providing ADTA to support its implementation, there was little Government ownership (para. 14) and the few associated loan covenants were too vague to provide a spur for reform. The Government has since made progress, without ADB assistance, in implementing further reforms, and recognizes the continuing need for reforms to complete the transition and streamline road sector arrangements (para. 46).

C. Effectiveness

57. The weakest aspects of project performance was concerned effectiveness. The Project was rated *less effective*. The road maintenance program was rated effective*,* the road rehabilitation was less effective*,* and the institutions and policy support is ineffective (Table 1). In assessing effectiveness, this evaluation considers whether intended outcomes were achieved or are likely to be achieved. It also takes into account the effect of the implementation process on project outcomes, including the effect of delays in outcomes, and implementation side effects.

58. **Road Rehabilitation**. The OEM found that the rehabilitated Gulshad–Akshatau section was performing adequately in terms of roughness, ability to carry traffic, and general operational features, and was allowing vehicles to travel at significantly higher speeds and at lower VOC than before rehabilitation. Average roughness in terms of the international roughness index (IRI) was reduced from about 7.8 to about 3.4 m per km. The average journey time was reduced from about 5 hours to about 2.5 hours.

59. Average VOC were significantly reduced. For example, the estimated VOC for 2005 were 20% lower for five-axle trucks, 19% lower for three-axle trucks, 18% lower for cars, and 21% lower for pickups. Details of VOC are in Appendix 8. Since both freight and bus services are privately operated, with prices determined through competition, it is likely that much of the VOC savings have been passed on to customers in the form of lower transport prices.

[35] The consultant and contractor were familiar with FIDIC contracts not only providing a means for carrying out construction according to design and specification, but also providing a mechanism for amending design and construction during implementation when unforeseen problems occurred through no fault of the contactor or consultant. However, MOTC was uneasy with notion of the consultant's independence, and with allowing the contract, design, and specification to be varied to address problems encountered. It was especially uneasy about considering proposals from the consultant and contractor that might require increases in the contract amount. This made it difficult for MOTC to accept some of the advice offered by the consultant, including proposals for addressing defects before they became serious.

[36] ADB has agreed to use modified versions of FIDIC in some other developing member countries, including India.